

# AS/A Level Applied Information and Communication Technology 9713

## Unit 2: How organisations use ICT

### Recommended Prior Knowledge

Students will require knowledge of the computer media and devices described in section 1

### Context

This section is the second in the syllabus and follows on from section 1

### Outline

This section covers how organisations use ICT

AO	Learning outcomes	Suggested Teaching activities	Learning resources
2a	Control systems	<p>You need to describe, in detail, the following examples of systems that require the maintaining of constant physical conditions:</p> <p><b>Air conditioning systems</b> Describe how air conditioning works referring to the web site link given opposite. Explain how these require the use of sensors to monitor temperature. Explain how by comparing the temperature with a preset value the microprocessor will cause the air conditioning fan motor unit to speed up or slow down by means of an actuator.</p> <p>Convert the information on the free patent site into language your students can understand. Explain the need for these in such areas as computer rooms, offices, homes in warm areas.</p>	<p>This website shows how an air conditioning system might work without a microprocessor.</p> <p><a href="http://home.howstuffworks.com/ac2.htm">http://home.howstuffworks.com/ac2.htm</a></p> <p><a href="http://www.freepatentsonline.com/5325286.html">http://www.freepatentsonline.com/5325286.html</a></p>

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		<p><b>Central heating systems</b>            Explain the use of keypads as input devices together with temperature sensors and contact switches. Explain the need for actuators to control valves and also other output devices such as LEDs.</p> <p>Explain how they are needed in offices and homes in cool areas.</p> <p><b>Refrigeration</b>            Explain that the main inputs would be through a temperature sensor, a contact switch for the door and a number pad or similar device to input the required temperature. The outputs would be the control of an actuator operating the compressor, LEDs showing temperature status and a warning buzzer if the door is left open as well as a timer to calculate how long the door had been left open.            Explain how different size of machines and different temperatures would be required in Supermarket chillers, freezers, wholesale butchers and breweries.</p> <p><b>Car manufacture:</b>            Use the website opposite to explain how industrial robots work. Describe different types of end effector. Describe the inputs i.e. pressure sensors for feeding back how tightly the end effector is being gripped, Describe the stepper motors required to activate the arm. Describe the need for timing mechanisms.            Robot arms are used in paint spraying car bodies and putting wheels on cars.            You could develop a class activity to show how humans would manufacture objects and how sensors attached to the human arm could feed back the necessary positions and actions of the arm to a microprocessor to program it.</p>	<p>This site explains how refrigerators work.  <a href="http://home.howstuffworks.com/refrigerator1.htm">http://home.howstuffworks.com/refrigerator1.htm</a></p> <p>This site gives its uses as well as an overview of how refrigerators are used.  <a href="http://en.wikipedia.org/wiki/Refrigerator#How_it_works">http://en.wikipedia.org/wiki/Refrigerator#How_it_works</a></p> <p>This site explains how robotic arms work.  <a href="http://electronics.howstuffworks.com/robot3.htm">http://electronics.howstuffworks.com/robot3.htm</a></p>

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		<p><b>Medical applications:</b> Intensive care Use the web sites opposite to explain the sensors needed. Explain that the system is a fairly limited control system; it is definitely not a closed loop system being more of a monitoring /measurement system.</p>	<p>This site gives a basic overview of how readings are taken.</p> <p><a href="http://www.theteacher99.btinternet.co.uk/the_teacher/gcse/newgcse/module9/task9.htm">http://www.theteacher99.btinternet.co.uk/the_teacher/gcse/newgcse/module9/task9.htm</a></p> <p>This site provides a detailed description of how the readings are used to produce an in-depth view of the patient's condition.</p> <p><a href="http://www.sciencedaily.com/releases/1998/10/981019075219.htm">http://www.sciencedaily.com/releases/1998/10/981019075219.htm</a></p> <p>This site explains the difference between open and closed loop systems.</p> <p><a href="http://www.school-resources.co.uk/Open%20and%20Closed%20Loop%20Control.htm">http://www.school-resources.co.uk/Open%20and%20Closed%20Loop%20Control.htm</a></p>
		<p><b>Process control</b> Define the batch, continuous and discrete types of process control. Batch: Some applications require that certain amounts of raw materials are combined in specific ways for particular lengths of time. An example is the production of adhesives and glues. These normally require the mixing of raw materials in a heated vessel for a period of time. This results in a glue or adhesive being produced. Other important examples are the production of food, beverages and medicine. Batch processes are generally used to produce relatively small amounts of the product per year. Continuous: The control of the water temperature in a heating jacket, for example, is an example of continuous process control. Some important</p>	<p>This gives a fairly detailed description.</p> <p><a href="http://en.wikipedia.org/wiki/Process_control">http://en.wikipedia.org/wiki/Process_control</a></p>

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		<p>continuous processes are the production of fuels, chemicals and plastics. Continuous processes, in manufacturing, are used to produce very large quantities of product per year.</p> <p>Discrete: This is when specific items are produced like the wheels of a car.</p> <p>Explain about "programmable logic controllers", or PLCs. They are used to read a set of digital and analogue inputs, apply a set of logic statements, and generate a set of analogue and digital outputs. In controlling temperature, the room temperature would be an input to the PLC. The logical statements would compare the pre set value to the input temperature and decide whether more or less heating was necessary to keep the temperature constant. A PLC output would then either open or close a hot water valve depending on whether more or less hot water was needed.</p>	
2b	Working practices	<p><b>Home working:</b></p> <p>Teleworker Information technology-based home working frequently, but not exclusively, falls into the category of "teleworking". This is officially defined as "working at a distance from your employer, either at home, on the road, or at a locally-based centre. Teleworkers use computers, telephones and faxes to keep in contact with their employers or customers".</p> <p>Illustrate your explanation of home working with the implications for managers of offices and explain how the majority of these types of workers tend to be sales staff.</p> <p>Benefits to the teleworker include: working the hours one chooses; freedom to attend to other commitments; flexible hours to fit around family, holidays, illnesses, and so on.</p> <p>Use the FSA site to show how they deal with issues such as:</p>	<p>This site gives a good description of the implications of home working.</p> <p><a href="http://www.fsa.gov.uk/pages/library/other_publications/staff/staff_handbook/patterns/homeworking/index.shtml">http://www.fsa.gov.uk/pages/library/other_publications/staff/staff_handbook/patterns/homeworking/index.shtml</a></p> <p>This site gives advantages and disadvantages of working from home.</p> <p><a href="http://www.businesslink.gov.uk/bdotg/action/detail?type=RESOURCES&amp;itemId=1074447134">http://www.businesslink.gov.uk/bdotg/action/detail?type=RESOURCES&amp;itemId=1074447134</a></p>

AO	<b>Learning outcomes</b>	<p><b>Suggested Teaching activities</b></p> <p>Circumstances in which home working may be considered.  Suitability of the employee/job for home working.  How contact with the office is to be maintained.  Impact on existing terms and conditions.  Equipment which will be provided by the FSA to the employee and how it must be cared for.  Technical Support available.  Insurance provided by FSA  Expenses not paid by FSA  Health and Safety responsibilities of the employee  Access to equipment must be provided by employee to the FSA  Data Protection rules to be followed by employee.  Training to be provided by the FSA  Duties and responsibilities - Managers' responsibilities and individual's responsibilities.  A list of advantages and disadvantages can be based on those given on the 'businesslink' website.</p> <p><b>Remote working:</b>  Examples of this type of working can be found in allowing sales staff to work from a 'remote' office.  Emphasise that home working is a subset of remote working.  Remote working can also mean hiring out small premises for short periods of time remote from main office where groups of workers can operate.  The IT for charities web site explains the alternative methods of connection for the remote worker to their headquarters.</p> <ul style="list-style-type: none"> <li>• Remote Access software</li> <li>• RAS (Remote Access Services)</li> <li>• Wide Area Networks (WAN)</li> <li>• VPNs (Virtual Private Networks)</li> </ul>	<p><b>Learning resources</b></p> <p>These sites give an example of home working.</p> <p><a href="http://www.egovmonitor.com/node/1691">http://www.egovmonitor.com/node/1691</a></p> <p><a href="http://www.knowab.co.uk/wbwflexwork.pdf">http://www.knowab.co.uk/wbwflexwork.pdf</a></p> <p><a href="http://www.businesslink.gov.uk/bdotg/action/layer?topicId=1074446319">http://www.businesslink.gov.uk/bdotg/action/layer?topicId=1074446319</a></p> <p>This site gives a breakdown of home/teleworking.</p> <p><a href="http://www.klbschool.org.uk/ict/gcse/theory/5_3/5_3_2_employment.htm#teleworking">http://www.klbschool.org.uk/ict/gcse/theory/5_3/5_3_2_employment.htm#teleworking</a></p> <p>This site specifically refers to how remote working is suitable for charity workers.</p> <p><a href="http://www.itforcharities.co.uk/ic/remote.htm">http://www.itforcharities.co.uk/ic/remote.htm</a></p> <p>Here is a website concentrating on management issues.</p> <p><a href="http://www.management-issues.com/display_page.asp?section=research&amp;id=1697">http://www.management-issues.com/display_page.asp?section=research&amp;id=1697</a></p> <p>Here is an article published in the Guardian newspaper:</p>
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AO	<p><b>Learning outcomes</b></p>	<p><b>Suggested Teaching activities</b></p> <ul style="list-style-type: none"> <li>• "Thin Client" access: Citrix/Microsoft Terminal Services</li> <li>• Internet/Intranet Access</li> </ul> <p>The site also mentions the possibility of database synchronisation (as offered by software such as Microsoft Access). It also suggests issues to consider.</p> <p>Mention how remote working would be beneficial for site workers.</p> <p>In order for workers to communicate with each other whether they are working in a fixed office, at home or at an alternative location they will need to use some or all of the following methods.</p> <p><b>Office based working:</b> Virtually all workers with clerical or management responsibilities are involved at some point in being based in an office environment. They will usually be working at a desktop machine which is connected to a LAN and possibly a WAN. Office workers will need to have access to the same sort of equipment that remote workers do.</p> <p><b>Video conferencing</b> Using the website opposite discuss the following Options for different parts of a Video Conferencing system Room layouts and their impact on conferences What video conferencing at different speeds actually looks like Tips on how to manage a conference, distribute materials, how to dress and act Checklists to help prepare for video conferencing</p> <p><b>Phone conferencing</b> Explain what this involves i.e. three or more people dial a number with a special code and are then able to hear the others speak and discussions can take place. The website provides answers to many</p>	<p><b>Learning resources</b></p> <p><a href="http://technology.guardian.co.uk/online/businesssolutions/story/0,12581,1491786,00.html">http://technology.guardian.co.uk/online/businesssolutions/story/0,12581,1491786,00.html</a></p> <p>This site gives an excellent description of video conferencing in schools. There are links on the left hand side of each page allowing the user to find out more detail.</p> <p><a href="http://www.wmnet.org.uk/vc/">http://www.wmnet.org.uk/vc/</a></p> <p><a href="http://www.egeneration.co.uk/centre/modules/green_ict/4.asp">http://www.egeneration.co.uk/centre/modules/green_ict/4.asp</a></p>
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		<p>questions and provides hints on different aspects of phone conferencing specifically as well as mentioning other types of conference.</p> <p>It explains what conferencing is and uses links to the three major UK providers to give a brief guide to conferencing.</p> <p>It answers questions such as</p> <ul style="list-style-type: none"> <li>When do I use a web-conference?</li> <li>When do I use a phone-conference?</li> <li>When do I use a reservationless conference?</li> <li>When do I use a video-conference?</li> </ul> <p>It provides hints and tips for successful conferences including general tips as well as tips for a successful web-conference and tips for a successful phone-conference. It suggests what additional services are typically available with phone-conferencing services. There is a section on the benefits of Telephone Conferencing including environmental benefits, social benefits and business Benefits. It also provides a list of applications which conferencing can be used with.</p> <p><b>Instant messaging</b> Give an overview of what instant messaging is as well as the benefits.</p> <p><b>Faxing</b> Describe how a fax operates and what it is used for. Make use of the sites listed opposite but be careful not to go into too much detail.</p> <p>Discuss the benefits and disadvantages of the traditional fax machine compared with the more modern electronic fax. Discuss the pros and cons of either when compared with emails</p>	<p>An overview of instant messaging and its benefits are provided on this site.</p> <p><a href="http://en.wikipedia.org/wiki/Instant_Messaging">http://en.wikipedia.org/wiki/Instant_Messaging</a></p> <p>These websites show how a fax machine operates.</p> <p><a href="http://en.wikipedia.org/wiki/Fax">http://en.wikipedia.org/wiki/Fax</a>  <a href="http://electronics.howstuffworks.com/fax-machine1.htm">http://electronics.howstuffworks.com/fax-machine1.htm</a></p> <p>This site discusses the benefits of electronic</p>

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2c	Use of ICT in Advertising	<p><b>Product advertising</b>            Explain that this is merely the advertising of one product whether it is something as simple as a chocolate bar or a house the principles are the same.            This wikipedia page gives a good general view of advertising.</p> <p>This page is specific about the different media which can be employed in advertising.</p> <p><b>Business advertising</b>            Explain the need for a business to become well known in order to make money. The business links site gives a good outline of how businesses can advertise themselves.</p> <p><b>Service advertising</b>            Advertising services are much the same as advertising businesses but may require a different method of advertising such as flyers and posters.</p>	<p>fax.</p> <p><a href="http://news.zdnet.co.uk/communications/0,39020336,39258995,00.htm">http://news.zdnet.co.uk/communications/0,39020336,39258995,00.htm</a></p> <p>This site discusses the advantage of fax in that it is legally admissible as evidence.</p> <p><a href="http://news.bbc.co.uk/1/hi/magazine/3320515.stm">http://news.bbc.co.uk/1/hi/magazine/3320515.stm</a></p> <p>This site gives a general view of advertising.</p> <p><a href="http://en.wikipedia.org/wiki/Advertising">http://en.wikipedia.org/wiki/Advertising</a></p> <p>This site gives a list of the different media which can be used in product advertising.</p> <p><a href="http://en.wikipedia.org/wiki/Advertising#Media">http://en.wikipedia.org/wiki/Advertising#Media</a></p> <p>This site is specific to the advertising of businesses.</p> <p><a href="http://www.businesslink.gov.uk/bdotg/action/layer?r.l2=1073858811&amp;r.l1=1073861169&amp;r.s=tl&amp;topicId=1073902778">http://www.businesslink.gov.uk/bdotg/action/layer?r.l2=1073858811&amp;r.l1=1073861169&amp;r.s=tl&amp;topicId=1073902778</a></p> <p>This site defines the service industry in terms of being the tertiary sector.</p> <p><a href="http://en.wikipedia.org/wiki/Service_industry">http://en.wikipedia.org/wiki/Service_industry</a></p>



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		<p>All aspects of the above types of advertising require the use of some or all of the following methods.</p> <p><b>Websites</b>            These are becoming more and more popular as a method of advertising.            Explain that it is claimed that Internet technology can be used to focus marketing on the customer, while at the same time linking to other aspects of the company's business. This can be done by:</p> <ul style="list-style-type: none"> <li>Identifying - the Internet is used for marketing research to find out the customers' needs;</li> <li>Anticipating - the Internet allows customers to access information and make purchases. For example a popular low-cost airline gets over 90% of its income from its online transactions.</li> <li>Satisfying - a key success factor in e-marketing is achieving customer satisfaction. The site must be easy to use, perform adequately and have a high standard of customer service and a satisfactory method of dispatching physical products.</li> <li>Explain, however, that a business web site cannot just sit on the Internet waiting to be discovered – it must be advertised.</li> <li>The in place website gives some excellent tips to businesses and explains how websites become popular.</li> </ul> <p>Helping a website to become popular is the use of free advertising on the Internet by making the most of search engines. This requires features such as the inclusion of good spelling, the use of metatags. There is an alternative which is to pay for the advertising and the website explains all this.</p>	<p>This site examines the use of Internet advertising.</p> <p><a href="http://en.wikipedia.org/wiki/Web_advertising">http://en.wikipedia.org/wiki/Web_advertising</a></p> <p>This site concentrates on advertising businesses on the Internet.</p> <p><a href="http://www.in-place.co.uk/">http://www.in-place.co.uk/</a></p>

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		<p><b>Multimedia presentations</b> Explain that advertising companies will help clients to produce multimedia presentations to advertise their business, services or products.</p> <p><b>Flyers</b> Explain that a flyer is a single page leaflet advertising a nightclub, event, service, or other activity. Flyers are typically used by individuals or small businesses and are a form of localised communication. Describe how desk top publishing software is used to produce them. Demonstrate how a flyer can be created in a matter of minutes using DTP.</p> <p><b>Posters</b> Explain how either DTP or presentation software can be used to produce posters making use of the websites opposite.</p>	<p>This website explains the various facets of multimedia. <a href="http://en.wikipedia.org/wiki/Multimedia">http://en.wikipedia.org/wiki/Multimedia</a></p> <p>This website describes flyers and has a link to desktop publishing which is the software usually used to produce flyers. <a href="http://en.wikipedia.org/wiki/Flyer_%28pamphlet%29">http://en.wikipedia.org/wiki/Flyer_%28pamphlet%29</a></p> <p>A brief introduction to the use of Powerpoint in producing posters. <a href="http://www.chembio.uoguelph.ca/posters/poster_create.htm">http://www.chembio.uoguelph.ca/posters/poster_create.htm</a></p> <p>An outline of how to use Desktop publishing software to produce posters and leaflets. This is actually a Microsoft Word document so it can be printed and distributed to your students. <a href="http://www.ltscotland.org.uk/Images/createpublicityusersheet_tcm4-118072.doc">http://www.ltscotland.org.uk/Images/createpublicityusersheet_tcm4-118072.doc</a></p>
2d	Use of ICT in Teaching and learning	<p>Schools, Universities, Colleges make use of all or some of the following:</p> <p><b>CAL</b></p>	<p>A useful reference for CAI is provided on.</p>

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		<p>Explain that the distinction between CBL and CAL is a little blurred. In order to differentiate between the two there is a clear delineation between CAI (Computer aided instruction) and CBL. CAL is often referred to as the use of a computer to provide instructional information to a student, to pose questions and to react to the student's response. CAI is similarly defined and is often felt to be a major component of CAL. Teach your students about CAI which involves the computer taking over the whole learning process. First of all the computer assesses the student's ability with a pre-test. The materials are presented in a manner which makes it easy for the student to navigate from page to page. It provides repetitive drills to improve the student's command of knowledge as well as providing game-based drills to increase learning enjoyment. It assesses student progress with a test at the end of the lesson as well as recording student scores and progress for later inspection.</p> <p><b>CBL</b> Computer Based Learning, sometimes abbreviated CBL, refers to the use of computers as a key component of the educational environment. While this can refer to the use of computers in a classroom, the term more broadly refers to a structured environment in which computers are used for teaching purposes. The concept is generally seen as being distinct from the use of computers in ways where learning is at least a peripheral element of the experience (e.g. computer games and web browsing). The teacher has complete control over the use of computers unlike CAI.</p> <p><b>Record keeping</b> Explain how test scores, exam marks and attendance records of students can be kept in simple spreadsheet format.</p> <p>As well as Schools, Universities and Colleges, Examination boards also make use of:</p>	<p><a href="http://en.wikipedia.org/wiki/Computer_aided_instruction">http://en.wikipedia.org/wiki/Computer_aided_instruction</a></p> <p>On this site it is referred to as CAL:</p> <p><a href="http://www.herts.ac.uk/ltdu/learning/whatiscal.pdf#search=computer%20aided%20learning">http://www.herts.ac.uk/ltdu/learning/whatiscal.pdf#search="computer aided learning"</a></p> <p>A useful reference is provided on.</p> <p><a href="http://en.wikipedia.org/wiki/Computer_Based_Learning">http://en.wikipedia.org/wiki/Computer_Based_Learning</a></p>

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		<p><b>Computer aided assessment</b></p> <p>This is now considered to be the use of computers to test students and to assess their progress. This can either be in a summative manner or in a formative manner. Summative assessment is the assessment of a student and giving them a mark or grade. An example of this type of assessment is the on-line assessment being used by the Qualifications and Curriculum Authority who are piloting the testing of students in ICT at the age of 14 in the UK. Pupils take two fifty minute tests where they are asked a variety of questions and have to perform a series of tasks. These are assessed and a level is then produced.</p> <p>Formative testing tests the ability of students but tells them what they have learned and what weaknesses they have and it also suggests ways in which they could improve. Any grade or mark resulting from this form of assessment tends not to be as important as the formative judgements.</p>	<p>This site gives the advantages and disadvantages of such systems.</p> <p><a href="http://www.herts.ac.uk/ltdu/learning/caa_procon.htm">http://www.herts.ac.uk/ltdu/learning/caa_procon.htm</a></p> <p>This site explains what factors to consider when designing tests.</p> <p><a href="http://www.elearn.malts.ed.ac.uk/services/CAA/index.phtml">http://www.elearn.malts.ed.ac.uk/services/CAA/index.phtml</a></p>
2e	Use of ICT in Publishing	<p>The printing of books, magazines and newspapers use some or all of the following:</p> <p><b>Computerised plate making</b> Use the website opposite. The page headed 'Step one pre-press production' explains in detail how plates are produced using the new computer technology.</p> <p><b>Computerised typesetting</b></p>	<p>This site explains how publishing materials electronically is gaining ground.</p> <p><a href="http://en.wikipedia.org/wiki/Electronic_publishing">http://en.wikipedia.org/wiki/Electronic_publishing</a></p> <p>This site explains how modern day print runs take place.</p> <p><a href="http://people.howstuffworks.com/offset-printing.htm">http://people.howstuffworks.com/offset-printing.htm</a></p> <p>A history of printing.</p>

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		<p>Explain how this technique has been completely taken over by computers. The web site opposite covers the history of printing from the use of compositors to produce typeset up to the modern day where DTP has replaced the need for compositors, particularly with the advent of so many different computer produced fonts.</p> <p><b>Facsimile transmission</b> Explain how the improvements made in the technology of facsimile transmission means that it is still used to transfer a newspaper from one site to another for printing. Use the site named opposite to illustrate this. The section headed 'Facsimile/Satellite' is particularly interesting.</p>	<p><a href="http://en.wikipedia.org/wiki/Typesetting">http://en.wikipedia.org/wiki/Typesetting</a></p> <p>This site describes how a newspaper is published using satellite technology and facsimile transmission.</p> <p><a href="http://www.usatoday.com/media_kit/pressroom/pr_production.htm">http://www.usatoday.com/media_kit/pressroom/pr_production.htm</a></p>
2f	Use of ICT in Time management	<p>Make it easy for students to understand the basic principles of time management. Introduce them to time management and how they can practise it. The web site opposite is a good example of how to look at carrying out a time audit.</p> <p>Managers of offices require help with the following:</p> <p><b>Organising meeting times</b> Explain how software can be used to keep a record of appointments.</p>	<p><a href="http://www.d.umn.edu/student/loon/acad/strat/time_audit.html">http://www.d.umn.edu/student/loon/acad/strat/time_audit.html</a></p> <p>The following website advertises a product. Do <b>NOT</b> take their appearance here as a recommendation from CIE. They are just meant to familiarise you with the software tools available for help with all aspects of time management.</p> <p>This website allows you to trial the software for 30 days but be very careful about what you commit yourself to, if you decide to do this.</p> <p><a href="http://www.sphericaltech.com/">http://www.sphericaltech.com/</a></p>

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		<p>Most business software has a calendar function which can be used as a diary and advises when clashes occur.</p> <p><b>Arranging workload</b></p> <p>This is done by using task usage reports which give a breakdown of the time required or spent on individual tasks. By allocating times for tasks realistically it is possible to ensure members of a team have equitable workloads.</p> <p><b>Research and development projects</b></p> <p>Business software helps to support these projects with calendars, time scales and Gantt charts etc.</p> <p><b>Construction project management</b></p> <p>Construction project management is not just specific to the construction of buildings. This method of project management is now applied to different types of project. It involves a critical path method of scheduling which is defined succinctly on the website opposite. The software mentioned on the site all contribute to the management of such projects by identifying project progress and providing daily and weekly planning</p>	<p>A definition of this is found at.</p> <p><a href="http://en.wikipedia.org/wiki/Critical_Path_Method_of_Scheduling">http://en.wikipedia.org/wiki/Critical_Path_Method_of_Scheduling</a></p>
2g	Data management	<p><b>Sequential file systems</b></p> <p>Sequential access means that data is accessed in a predetermined, ordered sequence. Sequential access is sometimes the only way of accessing the data, for example if it is on a tape. It may also be the access method we desire to use since the application requires processing a sequence of data elements in order.</p> <p>In data structures, a data structure is said to have sequential access if one can only visit the values it contains in one particular order. Batch processing requires the use of sequential access an example being a payroll system where every worker has to be paid. Since all the records have to be read anyway, the order in which they are</p>	<p>The definition of sequential access is given here.</p> <p><a href="http://en.wikipedia.org/wiki/Sequential_access">http://en.wikipedia.org/wiki/Sequential_access</a></p> <p>A revision of most types of file system is given here.</p> <p><a href="http://atschool.eduweb.co.uk/fairfax/ict/e2-8.htm">http://atschool.eduweb.co.uk/fairfax/ict/e2-8.htm</a></p>

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		<p>stored is not important.</p> <p><b>Indexed sequential &amp; random access files</b>  In an Indexed Sequential Access Method system, data is organized into records which are composed of fixed length fields. Records are stored sequentially, originally to speed access on a tape system. A separate table is kept of the indexes which are pointers into the tables.</p> <p>This allows individual records to be retrieved without having to search the entire set of data. The key feature of ISAM is that the index tables are small and can be searched quickly. This allows the database to access only the records it needs. Additionally modifications to the data do not require changes to other data, only the table and indexes in question.</p> <p>Random access is the ability to access any random element of a group in the same length of time. The opposite is sequential access, where a remote element takes longer time to access. In data structures, random access implies the ability to access any entry in a list of numbers in identical time. Very few data structures can guarantee this, other than arrays. Random access is critical to many functions such as fast sorting and binary searches.</p> <p>The use of this type of file system can be found in hybrid systems i.e. batch and interrogational processing combined. This is particularly useful when, say, payroll and personnel records are combined.</p> <p><b>Relational database systems</b>  A relational database is a database which consists of two or more linked tables of data. The link is through a key field. Strictly speaking, the term refers to a specific collection of data but it is normally used together with the software managing that collection of data. That software is more correctly called a <i>relational database management</i></p>	<p>A site describing indexed sequential access in detail.</p> <p><a href="http://en.wikipedia.org/wiki/Indexed_Sequential_Access_Method">http://en.wikipedia.org/wiki/Indexed_Sequential_Access_Method</a></p> <p>A definition of random access is given here.</p> <p><a href="http://en.wikipedia.org/wiki/Random_access">http://en.wikipedia.org/wiki/Random_access</a></p> <p>A description of relational databases is given here.</p> <p><a href="http://en.wikipedia.org/wiki/Relational_databases">http://en.wikipedia.org/wiki/Relational_databases</a></p>

AO	Learning outcomes	Suggested Teaching activities	Learning resources
2h	Use of data management	<p data-bbox="730 284 943 316"><i>system</i> (RDBMS).</p> <p data-bbox="730 347 1498 403">They are mainly used as Interrogational databases e.g. customer database linked to sales records.</p> <p data-bbox="730 451 1301 483"><b>Hierarchical database management systems:</b></p> <p data-bbox="730 483 1525 603">In hierarchical database management systems, data is organized into a tree-like structure in such a way that it cannot have too many relationships. The structure allows information to be repeated using parent/child relationships.</p> <p data-bbox="730 603 1547 659">An example would be: an organisation has records of employees in a table called Employees.</p> <p data-bbox="730 659 1216 691">In the table there would be fields such as</p> <ul data-bbox="730 691 913 826" style="list-style-type: none"> <li>• First Name</li> <li>• Last Name</li> <li>• Job Name</li> <li>• and Wage.</li> </ul> <p data-bbox="730 858 1473 914">The company also has data about the employee's children in a separate table called Children with fields such as</p> <ul data-bbox="730 946 913 1042" style="list-style-type: none"> <li>• First Name</li> <li>• Last Name</li> <li>• and DOB.</li> </ul> <p data-bbox="730 1074 1520 1201">The Employee table represents a parent segment and the Children table represents a Child segment. These 2 segments form a hierarchy where an employee may have many children but each child may only have 1 parent.</p> <p data-bbox="730 1233 1547 1350">Hierarchical structures were widely used in the first mainframe database management systems. However, owing to their restrictions, they often cannot be used to relate structures that exist in the real world.</p>	<p data-bbox="1576 435 1995 499">A definition of this type of database management system is given here.</p> <p data-bbox="1576 531 2092 595"><a href="http://en.wikipedia.org/wiki/Hierarchical_database_management_system">http://en.wikipedia.org/wiki/Hierarchical_database_management_system</a></p>



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		<p>Hierarchical relationships between different types of data can make it very easy to answer some questions, but very difficult to answer others. If a one-to-many relationship is violated (e.g., a patient can have more than one physician) then the hierarchy becomes a network.</p> <p>While the hierarchical model is rare in modern databases, it is common in many other means of storing information, ranging from file systems to the Windows registry to XML documents.</p> <p>It is used in systems such as On Line Analytical Processing which specialises in business reporting such as sales marketing, management reporting, business performance management (BPM) and also budgeting and forecasting.</p> <p><b>Network database management systems:</b> One type of network dbms is a distributed database. A distributed database is a database that is under the control of a central database management system (DBMS) in which storage devices are not all attached to a common CPU. It may be stored in multiple computers located in the same physical location, or may be dispersed over a network of interconnected computers.</p> <p>Collections of data (e.g. in a database) can be distributed across multiple physical locations. A distributed database is distributed into separate partitions/fragments. Each partition/fragment of a distributed database may be duplicated.</p> <p>The other type of network database is one which is held centrally but can be accessed simultaneously by many users remotely using a WAN or locally as part of a LAN.</p> <p>Good examples are large organisations spread over wide</p>	<p>This article describes distributed databases which can be another name for network database management systems.</p> <p><a href="http://en.wikipedia.org/wiki/Distributed_database">http://en.wikipedia.org/wiki/Distributed_database</a></p> <p>This site explains about the Police National Computer.</p> <p><a href="http://en.wikipedia.org/wiki/Police_National_Computer">http://en.wikipedia.org/wiki/Police_National_Computer</a></p>

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2i	Payroll applications	<p>geographical areas such as police officers using the PNC (Police National Computer in the UK) and the DVLA (Driver and Vehicle Licensing Authority) which can also be accessed by police officers remotely. The site opposite describes the PNC.</p> <p><b>Producing payslips</b>            Explain how payslips include information such as employee details including name and address, previous employment tax and National Insurance history.</p> <p>Standard payslip details include 'pay so far this year', holiday pay, pension and loan schemes. They also usually include Full Statutory Sick Pay and Statutory Maternity Pay details.</p> <p>Most payroll software allows the payslip calculations to be re-run before final run to allow for late adjustments. The calculations involve tax liabilities, National Insurance contributions and other deductions.</p> <p>Most payroll software allows cash books to be updated automatically deducting payments to employees. Payments to employees are automatically generated using BACS as well as tax and NI payments automatically made direct to the Inland Revenue.</p> <p>All this tends to be done on a monthly basis using batch processing.</p> <p>A transaction file is created at the end of the month containing details such as worker's number, hours worked etc. and this is used with the master file. The master file is updated and payslips produced and financial reports are generated.</p> <p><b>Financial reports</b>            Most payroll software has a report generator facility. This provides detailed payroll listings and exception reporting.            Reports can be produced showing hours worked and other cost</p>	<p>A guide to what constitutes payroll is given on this site.</p> <p><a href="http://en.wikipedia.org/wiki/Payroll">http://en.wikipedia.org/wiki/Payroll</a></p> <p>A basic guide to payroll transactions is shown on this site on slides 6 to 8.</p> <p><a href="http://www.billericay.essex.sch.uk/Faculty/ict/alevel/ict2/modes_processing.ppt#260">http://www.billericay.essex.sch.uk/Faculty/ict/alevel/ict2/modes_processing.ppt#260</a></p>

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2j	Technical and customer support	<p>information by department or individual. Reports can be created covering a range of topics including the analysis of the turnover of employees together with detailed absence reports.</p> <p><b>Utility companies</b> Electricity, gas and water companies operate help centres which offer customer support. These are usually call centres which have operators ready to deal with customer enquiries regarding breaks in the service and also problems with paying bills.</p> <p><b>Mail order catalogue firms</b> Most of these operate telephone call centres. A call centre consists of several telephone operators each sat at a work station. This consists of a computer, a telephone set/headset connected to a telecom switch. It can be operated on its own or can be networked to additional centres using a computer network sometimes consisting of mainframes, microcomputers and LANs. Computer telephony integration (CTI) is being used more and more to combine the data and voice input to the system.</p> <p><b>Customer support for computer hardware and software</b> On-line help is provided by most hardware and software manufacturers. In addition help lines are provided. The on-line help asks customers to click on links which narrow down their problem and hopefully provide a solution. For a class activity get your students to load the cymru1 web site and</p>	<p>A description of what technical support consists of is given here.</p> <p><a href="http://en.wikipedia.org/wiki/Customer_support">http://en.wikipedia.org/wiki/Customer_support</a></p> <p>This is a site for the Mid Kent Water company in the UK illustrating the type of customer support available.</p> <p><a href="http://www.midkentwater.co.uk/mkw/mkw/support.htm">http://www.midkentwater.co.uk/mkw/mkw/support.htm</a></p> <p>A description of a call centre is given on this site.</p> <p><a href="http://en.wikipedia.org/wiki/Call_centre">http://en.wikipedia.org/wiki/Call_centre</a></p> <p>This site gives a definition of online help.</p> <p><a href="http://en.wikipedia.org/wiki/Online_Help">http://en.wikipedia.org/wiki/Online_Help</a></p> <p>This site is an example of on line help.</p>

<b>AO</b>	<b>Learning outcomes</b>	<b>Suggested Teaching activities</b> come up with an imaginary problem and see how successful the system is at solving the problem.	<b>Learning resources</b> <a href="http://www.cymru1.net/help/connecthelp.php">http://www.cymru1.net/help/connecthelp.php</a>
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